Appendix E

Sample BMP Monitoring Field Sheets

Montana:
Forestry Best Management Practices
Implementation Monitoring

The 1996 Forestry BMP Audits
FInal Report

Department of Natural Resources and Conservation
Forestry Division
Missoula, Montana

DS-49

BMP FIELD AUDITS
SITE INFORMATION

Site Number: _____ Meets Selection Criteria: _____
High Hazard: _____

Site Name: _____

Owner: _____

Legal Description: _____ County: _____

Primary Drainage: _____ Month/Year Harvested: _____

Stream Within 200 Ft.? Y / N Name: _____ Bankfull Width: _____

Unit Size: _____ Volume Removed: _____

Road Construction: _____ Length: _____

Road Reconstruction: _____ Length: _____

Slash Disposal Complete: _____ Method: _____

Logging Method: _____

Slope: 0-5% ____; 5-20% ____; 20-40% ____; 40%+ ____

Parent Material: _____

Soil Erodibility: High ___ Medium ___ Low ___

Harvest in Riparian: Y / N

Stream Class:

Comments:

RATING GUIDE

APPLICATION
5--OPERATION EXCEEDS REQUIREMENTS OF BMP
4--OPERATION MEETS REQUIREMENTS OF BMP
3--MINOR DEPARTURE FROM BMP
2--MAJOR DEPARTURE FROM BMP
1--GROSS NEGLECT OF BMP

EFFECTIVENESS
5--IMPROVED PROTECTION OF SOIL AND WATER RESOURCES OVER PRE-PROJECT CONDITION
4--ADEQUATE PROTECTION OF SOIL AND WATER RESOURCES
3--MINOR AND TEMPORARY IMPACTS ON SOIL & WATER RESOURCES
2--MAJOR AND TEMPORARY OR MINOR AND PROLONGED IMPACTS ON SOIL AND WATER RESOURCES.
1--MAJOR AND PROLONGED IMPACTS ON SOIL AND WATER RESOURCES.

DEFINITIONS (BY EXAMPLE):
ADEQUATE--SMALL AMOUNT OF MATERIAL ERODED; MATERIAL DOES NOT REACH DRAWS, CHANNELS, OR FLOODPLAIN.
MINOR--EROSION AND DELIVERY OF MATERIAL TO DRAWS BUT NOT STREAM.
MAJOR--EROSION AND SUBSEQUENT DELIVERY OF SEDIMENT TO STREAM OR ANNUAL FLOODPLAIN.
TEMPORARY--IMPACTS LASTING ONE YEAR OR LESS; NO MORE THAN ONE RUNOFF SEASON.
PROLONGED--IMPACTS LASTING MORE THAN ONE YEAR.

NR--NOT REVIEWED NA--NOT APPLICABLE

FIELD AUDIT

Date: _____

Team Leader/Recorder: _____

Team Members: _____

_____

Observers Present:

MONTANA FOREST PRACTICES REVIEW WORKSHEET

BMPs Applicable to:
+ New Road Construction
* Existing Roads
▸ Reconstruction

	RECOMMENDED BEST MANAGEMENT PRACTICES	APPLICABLE TO SITE (Y/N)	APPLICATION	EFFECTIVENESS	COMMENTS
	SECTION I--ROADS				
	ROAD PLANNING & LOCATION SECTION I.A.				
▸+	1a. MINIMIZE NUMBER OF ROADS NECESSARY.				
*	1b. USE EXISTING ROADS UNLESS AGGRAVATE EROSION.				
+	3. AVOID LONG, SUSTAINED, STEEP ROAD GRADES.				
+	4. LOCATIONS AVOID HIGH HAZARD SITES (I.E., WET AREAS AND UNSTABLE SLOPES).				
+	5. ADEQUATE SMZ BETWEEN ROAD AND STREAM CHANNELS WHERE ROADS ARE LOCATED ALONG STREAMS.				
+	6a. MINIMIZE NUMBER OF STREAM CROSSINGS. NUMBER _____.				
+	6b. CHOOSE STABLE STREAM CROSSING SITES.				
	ROAD DESIGN SECTION I.B.				
▸+	2. DESIGN ROADS TO MINIMUM STANDARD NECESSARY TO ACCOMMODATE ANTICIPATED USES.				
+	4. VARY ROAD GRADE TO REDUCE CONCENTRATED DRAINAGE.				
+▸	5. PROPER SIZING FOR CROSSING STRUCTURES.				
	DRAINAGE FROM ROAD SURFACE SECTION I.C.				
+▸*	1. PROVIDE ADEQUATE ROAD SURFACE DRAINAGE FOR ALL ROADS.				

I.D. _____ + New Road Construction; * Existing Roads; ▸ Reconstruction

	RECOMMENDED BEST MANAGEMENT PRACTICES	APPLICABLE TO SITE (Y/N)	APPLICATION	EFFECTIVENESS	COMMENTS
+▸	2. SKEW DITCH RELIEF CULVERTS.				
+▸*	4. PROVIDE ENERGY DISSIPATORS AT DRAINAGE STRUCTURE OUTLETS WHERE NEEDED.				
+▸*	6. ROUTE ROAD DRAINAGE THROUGH ADEQUATE FILTRATION ZONES BEFORE ENTERING A STREAM.				
	CONSTRUCTION/RECONSTRUCTION SECTION I.D.				
+▸	2. STABILIZE ERODIBLE SOILS (I.E., SEEDING, BENCHING, MULCHING).				
+▸	3. SLASH FILTER WINDROWS INSTALLED.				
+▸	5. CUT AND FILL SLOPES AT STABLE ANGLES. SLOPE RATIO: _____.				
+▸	6. AVOID INCORPORATING WOODY DEBRIS IN ROAD FILL.				
+▸	8. EXCESS MATERIALS (WASTE) PLACED IN LOCATIONS THAT AVOID ENTERING STREAM.				
+▸	9. SEDIMENT FROM BORROW PITS AND GRAVEL PITS MINIMIZED.				
▸	10. RECONSTRUCT ONLY TO THE EXTENT NECESSARY TO PROVIDE ADEQUATE DRAINAGE AND SAFETY.				
	ROAD MAINTENANCE SECTION I.E.				
+▸*	1. GRADE ROADS IF NECESSARY TO MAINTAIN DRAINAGE.				
+▸*	2. MAINTAIN EROSION CONTROL FEATURES (DIPS, DITCHES AND CULVERTS FUNCTIONAL).				
*	3. AVOID CUTTING THE TOE OF CUT SLOPES.				
+▸*	6. AVOID USE OF ROADS DURING WET PERIODS AND SPRING BREAKUP.				
+▸*	8. ABANDONED ROADS IN CONDITION TO PROVIDE ADEQUATE DRAINAGE WITHOUT FURTHER MAINTENANCE.				

I.D. _____ + New Road Construction; * Existing Roads; ▸ Reconstruction

RECOMMENDED BEST MANAGEMENT PRACTICES	APPLICABLE TO SITE (Y/N)	APPLICATION	EFFECTIVENESS	COMMENTS
SECTION II--TIMBER HARVESTING				
HARVEST DESIGN SECTION II.A.				
2. SUITABLE LOGGING SYSTEM FOR TOPOGRAPHY, SOIL TYPE AND SEASON OF OPERATION.				
5. DESIGN AND LOCATE SKID TRAILS TO AVOID CONCENTRATING RUNOFF.				
6. SUITABLE LOCATION, SIZE, AND NUMBER OF LANDINGS.				
OTHER HARVESTING ACTIVITIES SECTION II.C.				
1a. SKIDDING OPERATION MINIMIZES SOIL COMPACTION AND DISPLACEMENT.				
1b. AVOID TRACTOR SKIDDING ON UNSTABLE SLOPES AND SLOPES THAT EXCEED 40% UNLESS NOT CAUSING EXCESSIVE EROSION.				
2a. ADEQUATE DRAINAGE FOR TEMPORARY ROADS, SKID TRAILS AND FIRE LINES.				
2b. ADEQUATE DRAINAGE FOR LANDINGS.				
SLASH TREATMENT AND SITE PREPARATION SECTION II.D.				
2. BRUSH BLADES USED ON DOZERS.				
4. SCARIFY ONLY TO THE EXTENT NECESSARY TO MEET REFORESTATION OBJECTIVE.				
5. ACTIVITIES LIMITED TO FROZEN OR DRY CONDITIONS TO MINIMIZE SOIL COMPACTION AND DISPLACEMENT.				
6. EQUIPMENT OPERATIONS ON SUITABLE SLOPES ONLY.				
9. LIMIT WATER QUALITY IMPACT OF PRESCRIBED FIRE.				

I.D. _____ + New Road Construction; * Existing Roads; ▸ Reconstruction

RECOMMENDED BEST MANAGEMENT PRACTICES	APPLICABLE TO SITE (Y/N)	APPLICATION	EFFECTIVENESS	COMMENTS
SECTION III--STREAM CROSSINGS				
LEGAL REQUIREMENTS SECTION III.A.				
▸+ 1. PROPER PERMITS FOR STREAM CROSSINGS.				
DESIGN CONSIDERATIONS SECTION III.B.				
▸+ 1a. CROSS STREAMS AT RIGHT ANGLES, IF PRACTICAL.				
▸+ 1b. DIRECT ROAD DRAINAGE AWAY FROM STREAM CROSSING SITE.				
▸+ 2. AVOID UNIMPROVED STREAM CROSSINGS.				
INSTALLATION OF STREAM CROSSINGS SECTION III.C.				
▸+ 1. MINIMIZE STREAM CHANNEL DISTURBANCE.				
▸+ 2. CULVERTS CONFORM TO NATURAL STREAMBED AND SLOPE.				
▸+ 3. PREVENT EROSION OF CULVERT AND BRIDGE FILLS (I.E., ARMOR INLET AND OUTLET.				
▸+ 5. MINIMUM COVER FOR CULVERTS PROVIDED.				
SECTION V--HAZARDOUS SUBSTANCES				
GENERAL SECTION V.A.				
2. ADEQUATE STORAGE AND DISPOSAL FOR FUEL, SHOP DEBRIS, AND WASTE OIL.				
WERE ANY CWE ASSESSMENTS OR WATERSHED ANALYSIS INCLUDED IN THE TIMBER HARVEST PLANNING? IF YES, WHAT TYPE AND LEVEL OF ANALYSIS WAS CARRIED OUT (I.E., MONITORING, SCREENING, CWE INDICES, INTERDISCIPLINARY TEAMS, ASSESSMENTS OF CHANGING GEOMORPHIC PROCESSES, A COMBINATION OF TWO OR MORE.)	RESPONSE:			

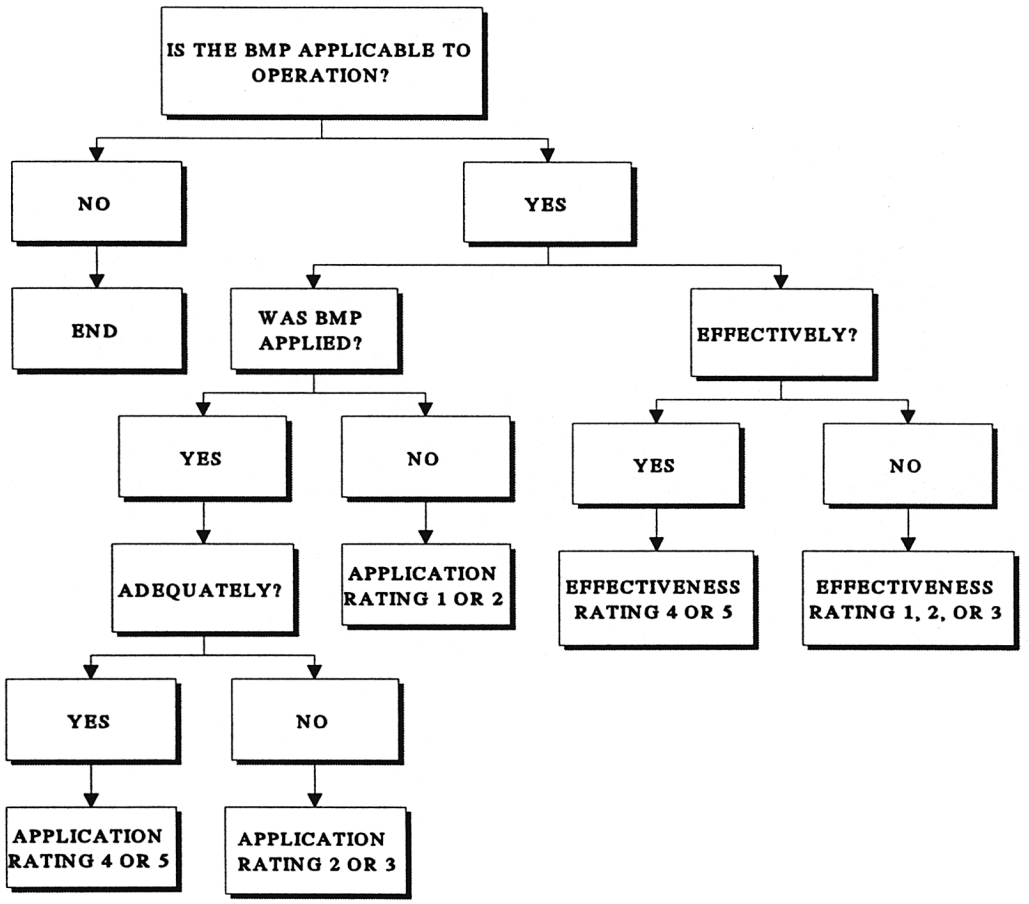
I.D. _____ + New Road Construction; * Existing Roads; ▸ Reconstruction

STREAMSIDE MANAGEMENT ZONE SITE INFORMATION	
ARE SMZ RULES APPLICABLE? (EFF. 3/15/93)	Y / N
WERE ANY PRE-APPROVED ALTERNATIVE PRACTICES UTILIZED? (* DENOTES PRACTICES THAT APPLY.)	Y / N (LIST APPLIED PRACTICES)
WERE ANY DNRC-APPROVED SITE-SPECIFIC ALTERNATIVE PRACTICES IMPLEMENTED IN THE HARVEST ACTIVITIES? (** DENOTES PRACTICES THAT APPLY.)	Y / N (LIST APPLIED PRACTICES)

RECOMMENDED BEST MANAGEMENT PRACTICES	APPLICABLE TO SITE (Y/N)	APPLICATION	EFFECTIVENESS	COMMENTS
1. ADEQUATE SMZ WIDTH MAINTAINED AND PROPERLY MARKED? AVG. WIDTH _____.				
2. EXCLUSION OF BROADCAST BURNING IN SMZ.**				
3. SMZ RETENTION TREE REQUIREMENTS MET. (# OF TREES, REPRESENTATIVE OF PRE-HARVEST STAND, FAVOR BANK-EDGE AND LEANING TREES, SHRUBS AND SUBMERCHANTABLE)**				
4. EXCLUSION OF EQUIPMENT OPERATION IN SMZ EXCEPT ON ESTABLISHED ROADS.*				
5. EXCLUDE CONSTRUCTION OF ROADS IN THE SMZ EXCEPT WHEN NECESSARY TO CROSS A STREAM OR WETLAND.**				
6. EXCLUSION OF ROAD FILL MATERIAL DEPOSITED IN SMZ EXCEPT AS NEEDED TO CONSTRUCT CROSSINGS.				
7. EXCLUSION OF SIDE-CASTING OF ROAD MATERIAL INTO A STREAM, LAKE, WETLAND OR OTHER BODY OF WATER DURING ROAD MAINTENANCE.				
8. EXCLUSION OF SLASH IN STREAMS, LAKES OR OTHER BODIES OF WATER.**				
9. EXCLUDE THE HANDLING, STORAGE, APPLICATION OR DISPOSAL OF HAZARDOUS OR TOXIC MATERIALS IN THE SMZ IN A MANNER THAT POLLUTES OR CAUSES DAMAGE OR INJURY.				

ADDITIONAL COMMENTS:

RATIONALE FOR THE RATING SYSTEM
POST HARVEST EVALUATION



U.S. Department of Agriculture
Forest Service

Investigating Water Quality in the Pacific Southwest Region:
Best Management Practices Evaluation Program

Pacific Southwest Region
1992

Best Management Practices Evaluation

UTM Coordinates Zone __ __
Easting __ __ __ __ __ __
Northing __ __ __ __ __ __ __

Form T01: Streamside Management Zones
(BMP 1.8, 1.19, 1.22)

ID#: _____

Selection Code: _____

Reviewer(s) _____ Title(s) _____ Date _____ Forest _____ District _____ T _____ R _____ S _____

Project _____ Unit # _____ Year Logging Occurred _____ Rock Type _____ Stream _____

SMZ Rx: _____ Activity Status _____ NFS Watershed _____

IMPLEMENTATION

	Rating
1) Was SMZ clearly identified on the ground?	_____
2) SMZ width is as specified?	_____
3) Treatment of SMZ is as prescribed?	_____
4) Mechanized equipment restricted from SMZ during timber harvest except at approved crossings?	_____
5) Logging slash in SMZ treated by means other than mechanized equipment?	_____

1 = Exceeds contract/project requirements
2 = Meets contract/project requirements
3 = Minor departure from contract/project requirements
4 = Major departure from contract/project requirements
Rate as NA if criteria not applicable at this site

If any rating is "3" or "4", complete the following:

Problem occurred in which phase(s) of the project: ☐ Site Evaluation ☐ Plan Prescription ☐ EA ☐ Contract ☐ Layout ☐ Administration ☐ Post Sale

Describe deficiencies and corrective actions:

EFFECTIVENESS

1) Groundcover (Objective:____%*)	☐ No disturbance or meets or exceeds objective	☐ Groundcover ≥ 80% of objective	☐ Groundcover < 80% of objective
2) Canopy cover (Objective:____%*)	☐ No disturbance or meets or exceeds objective	☐ Canopy cover ≥ 90% of objective	☐ Canopy cover < 90% of objective
3) Disturbance to streambanks	☐ None evident	☐ Disturbance is less than 5% of channel length	☐ Activities have disturbed more than 5% of channel length
4) Sediment to channel	☐ Evidence of sediment movement to SMZ	☐ Erosion/sediment movement into SMZ but no sediment to channel	☐ Evidence that sediment has entered channel

*Use project, LMP or Forest Objective. If prescription is "no disturbance", enter "100".

If poor effectiveness is evident, comment on:
(1) Possible causes *(e.g., site sensitivity, inadequate BMP prescription, major storm event, etc.):*

(2) The degree and duration of effects on beneficial uses of water:

Continued on reverse? ☐

Best Management Practices Evaluation

UTM Coordinates Zone __ __
Easting __ __ __ __ __ __
Northing __ __ __ __ __ __ __

Form T02: Skid Trails
(BMP 1.10 & 1.17)

ID#: _____

Selection Code: _____

Reviewer(s) _____ Title(s) _____ Date _____ Forest _____ District _____

Project _____ Unit # _____ Year Logging Occurred _____ T _____ R _____ S _____

Rock Type _____ NFS Watershed _____

IMPLEMENTATION

Skid Trails comply with FSH standards, and any special EA conditions as they relate to:

		Rating
a)	Location	_____
b)	Drainage and Erosion Control	_____
c)	Width	_____
d)	Drainage Crossings	_____
f)	Endlining *(if req. by TSC C.6.422)*	_____

1 = Exceeds contract/project requirements
2 = Meets contract/project requirements
3 = Minor departure from contract/project requirements
4 = Major departure from contract/project requirements
Rate as NA if criteria not applicable at this site

If any Implementation Rating is "3" or "4", complete the following:

Problem occurred in which phase(s) of the project: ☐ Site Evaluation ☐ Plan Prescription ☐ EA/EIS ☐ Contract ☐ Layout ☐ Administration

Describe deficiencies and corrective actions:

EFFECTIVENESS

1) Ground Disturbance	☐ Skid trails disturb less than 10% of unit	☐ Skid trails disturb > 10% but < 15% of unit	☐ Skid trails disturb > 15% of unit
2) Erosion on skid trail surface	☐ Little or no evidence of rills	☐ Rills present, but occur on < 20% of skid trail surfaces	☐ > 20% of surface has rills, or rills present that are > 2" deep and > 10' long
3) Rutting	☐ Little or no evidence of rutting	☐ Some rutting present, but < 10% of area has ruts > 2" deep	☐ > 10% of surface length has ruts >2" deep
4) Waterbars			
a) Diversion of runoff	☐ < 10% of waterbars fail to divert flow off of skid trail	☐ >10% but < 20% of waterbars fail to divert flow off skid trails	☐ > 20% of waterbars fail to divert flow from skid trail
b) Sediment below outlet	☐ Sediment deposition absent or does not extend beyond outlet control	☐ Sediment deposition evident but does not extend > 20' below waterbar outlet	☐ Sediment deposition extends > 20' below waterbar outlet
c) Erosion below outlet	☐ No evidence of rills or gullies	☐ Rills present, but < 20' long or occur on < 20% of waterbar outlets	☐ Rills > 20' long or occur on > 20% of waterbar outlets
d) Sediment to channel	☐ No evidence of transport to SMZ	☐ Sediment deposited in SMZ but not in channel	☐ Evidence of sediment transport to or deposition in channel

over

Form T02: Skid Trails *(Page 2)*

(BMP 1.10 & 1.17)

EFFECTIVENESS *(ccntinued)*

FOR SITES WITH STREAM CROSSINGS:

5) Sediment to Channel: stream crossing rilling	☐ Rills may be evident, but are infrequent appear stable, with no evident sediment delivery to channel	☐ Rills present, but average less than 1 per 5' lineal, rills not enlarging. Minimal evidence of deposition in channel. No gullies	☐ Numerous rills present (>1 per 5" lineal) apparantly active or enlarging, evidence of delivery to channel, or gullies present

If poor effectiveness is evident, comment on:
(1) Possible causes *(e.g., site sensitivity, inadequate BMP prescription, major storm event, etc.):*

(2) The degree and duration of effects on beneficial uses of water:

Best Management Practices Evaluation

UTM Coordinates Zone __ __
Easting __ __ __ __ __ __
Northing __ __ __ __ __ __ __

Form T04: Landings
(BMP 1.12, 1.16)

ID#: _____

Selection Code: _____

Reviewer(s) _____ Title(s) _____ Date _____ Forest _____ District _____ T _____ R _____ Sec _____

Project _____ Unit # _____ Year Logging Occurred: _____ Rock Type _____ NFS Watershed _____

Special measures required on this landing: ☐ Vegetative Soil Stabilization (C6.601) ☐ Special Erosion Control (C6.602) ☐ Soil Scarification (C6.603)

IMPLEMENTATION

Was the landing ripped? ☐ yes ☐ no

Landing placement and erosion control treatment complies with FSH 2409.23 standards, and any special EA conditions as they relate to:

	Rating
a) Location	_____
b) Drainage	_____
c) Size	_____
d) Rehab	_____

1 = Exceeds contract/project requirements
2 = Meets contract/project requirements
3 = Minor departure from contract/project requirements
4 = Major departure from contract/project requirements
Rate as NA if criteria not applicable at this site

If any rating is "3" or "4", complete the following:

Problem occurred in which phase(s) of the project: ☐ Site Evaluation ☐ Plan Prescription ☐ EA ☐ Contract ☐ Layout ☐ Administration

Describe deficiencies and corrective actions:

EFFECTIVENESS

1) Landing Surface Erosion

a) Rilling	☐ Less than 1 rill per 100' of transect	☐ Some rilling but less than 1 rill per 20' of transect	☐ Rilling present that exceeds 1 rill per 20' of transect, or gullying present

2) Drainage *(Describe type of drainage control used: outsloping, waterbars, etc.)* _____

a) Drainage runoff structure	☐ No evidence of concentrated flow	☐ Evidence of rills or gullies from concentrated flow, but do not extend > 20' below edge of landing	☐ Evidence of rills or gullies resulting from concentrated flow which extend > 20' below edge of landing

3) Landing fill slopes *(Write NA if there are no fill slopes on the landing you are evaluating)*

a) Rilling	☐ No evidence of rills	☐ Rills present but do not extend > slope length below toe of fill	☐ Rills present and extend > slope length below toe of fill
b) Sediment below fillslope	☐ Little or none	☐ Some deposition, but none > slope length below toe of fill	☐ Heavy deposition & extends beyond toe of fill

4) Sediment

a) Sediment to nearest channel	☐ No evidence of transport to SMZ	☐ Sediment deposition in SMZ but not channel	☐ Evidence of sediment transport to or deposition in channel
b) Slope failures	☐ < 1 cubic yard of material moved	☐ ≥ 1 cubic yard of material moved but does not enter channel	☐ ≥ 1 cubic yard of material moved, some material enters channel

If poor effectiveness is evident, comment on:
(1) Possible causes *(e.g., site sensitivity, inadequate BMP prescription, major storm event, etc.):*

(2) The degree and duration of effects on beneficial uses of water:

Continued on reverse? ☐

Best Management Practices Evaluation

UTM Coordinates **Zone** __ __
Easting __ __ __ __ __ __
Northing __ __ __ __ __ __ __

Form E08: Road Surface, Drainage and Slope Protection
(BMP 2.2, 2.4, 2.5, 2.7, 2.10, 2.23)

ID#: _____

Selection Code: _____

Reviewer(s) _____ Title(s) _____ Date _____ Forest _____ District _____ T _____ R _____ S _____

Project _____ Road # _____ Year Construction Completed _____ Last Maintenance _____

Project is: ☐ Construction ☐ Reconstruction ☐ Maintenance ☐ Other (describe) _____ NFS Watershed _____

IMPLEMENTATION

Rating

1 = Exceeds contract/project requirements
2 = Meets contract/project requirements
3 = Minor departure from contract/project requirements
4 = Major departure from contract/project requirements
Rate as NA if criteria not applicable at this site

For construction or reconstruction projects:

1) Design objectives developed that address water quality issues identified by ID or review team ..... _____
2) Design meets objectives ..... _____
3) Construction/Reconstruction contract requirements met for:
   a) Surfacing ..... _____
   b) Drainage ..... _____
   c) Slope stabilization ..... _____
   d) Slash disposal ..... _____

For maintenance projects:

1) Check appropriate means of maintenance accomplishment: ☐ Timber sale contract
   ☐ Force account
   ☐ Maintenance contract
   ☐ Other (_____)
2) Maintenance specifications were met for:
   a) Surface blading/repair/treatment ..... _____
   b) Drainage structure repair/treatment ..... _____
   c) Slope treatment/sidecast ..... _____

If any rating is "3" or "4", complete the following:

Problem occurred in which phase(s) of the project: ☐ Location ☐ Design ☐ EA ☐ Contract ☐ Construction ☐ Maintenance

Describe deficiencies and corrective actions:

over

Form E08: Road Surface, Drainage and Slope Protection *(page 2)*

(BMP 2.2, 4, 5, 7, 10, 23)

Evaluation starting point was adjacent to a: ☐ Perennial ☐ Intermittent ☐ Ephemeral stream

EFFECTIVENESS

1) Road surface			
a) Rilling	☐ Little or no evidence	☐ Some present, but occurs on <10% of road length, or where present do not leave road surface	☐ >10% of surface length has rills 2" deep and 20' in length which continue off road surface
2) Fill slopes			
a) Rilling	☐ No evidence of rills	☐ Rills present but do not extend > slope length below toe	☐ Rills present and extend > slope length below toe
b) Sediment to nearest channel	☐ No evidence of transport to SMZ	☐ Sediment deposition in SMZ but not channel	☐ Sediment from fill slope enters channel
c) Slope failures	☐ Less than 5 cubic yards of material moved	☐ ≥ 5 cubic yards of material moved, material does not enter channel	☐ Slide material enters channel
3) Cut slope failure/inside ditch			
	☐ Less than 5 cubic yards of material moved and material does not enter channel	☐ ≥ 5 cubic yards of material moved but does not enter drainage way to channel	☐ ≥ 5cubic yards of material moved. > 2 cubic yards of material transported to channel
4) Cross drains *(Note: apply E09 evaluation at streamcrossings. Use these criteria at cross drain pipes, dips, waterbars or other cross drain structures if they occur along transect.)*			
a) Scour at outlet	☐ No evidence of scour	☐ Scour evident, but does not extend >20' below outlet	☐ Scour and/or sediment extends to stream channel
b) Plugging	☐ No evidence of sediment or debris restricting flow	☐ Sediment and/or debris is accumulating, but ≤ 30% of inlet or outlet is blocked	☐ Sediment and/or debris is blocking > 30% of inlet or outlet

If poor effectiveness is evident, comment on:
(1) Possible causes *(e.g., site sensitivity, inadequate BMP prescription, major storm event, etc.):*

(2) The degree and duration of effects on beneficial uses of water:

Best Management Practices Evaluation

UTM Coordinates Zone __ __
Easting __ __ __ __ __ __
Northing __ __ __ __ __ __ __

Form E09: Stream Crossings
(BMP 2.1, 2.4, 2.5, 2.7, 2.10, 2.23)

ID#: _____

Selection Code: _____

Reviewer(s) _____ Date _____ Forest _____ District _____ T _____ R _____ S _____ NFS Watershed _____

Project _____ Road # _____ Year Construction Completed _____ Last Maintenance _____

Project is: ☐ Construction ☐ Reconstruction ☐ Maintenance ☐ Other (describe) _____

IMPLEMENTATION

Rating

1 = Exceeds contract/project requirements
2 = Meets contract/project requirements
3 = Minor departure from contract/project requirements
4 = Major departure from contract/project requirements
Rate as NA if criteria not applicable at this site

For construction or reconstruction projects:

1) Design objectives developed that address water quality issues identified by ID or review team ..... _____

   Crossing structure design-flow return period _____

2) Design meets objectives ..... _____

3) Construction/Reconstruction contract requirements met for:

   a) Slash disposal ..... _____
   b) Structure type ..... _____
   c) Road surface ..... _____
   d) Structure placement (culvert, bridge, etc.) ..... _____
   e) Slope stabilization ..... _____
   f) Drainage ..... _____

For maintenance projects:

1) Check appropriate means of maintenance accomplishment: ☐ Timber sale contract
   ☐ Force account
   ☐ Maintenance contract
   ☐ Other (_____)

2) Maintenance specifications were met for:

   a) Drainage structure repair/treatment ..... _____
   b) Slope treatment/sidecast ..... _____
   c) Surface treatment ..... _____

If any rating is "3" or "4", complete the following:

Problem occurred in which phase(s) of the project: ☐ Location ☐ Design ☐ EA ☐ Contract ☐ Construction ☐ Maintenance

Describe deficiencies and corrective actions:

over

Form E09: Stream Crossings *(page 2)*

Stream crossing is at a: ☐ Perennial ☐ Intermittent ☐ Ephemeral stream

EFFECTIVENESS

1) Fill Slopes			
a) Vegetative cover	☐ Vigorous dense cover, or fillslope of stable material	☐ Less than full cover, but > 50% of fillslope has effective cover or is stable material	☐ < 50% of fillslope has effective cover or is stable material
b) Rilling	☐ Rills may be evident, but are infrequent, stable, with no evident sediment delivery to channel	☐ Rills present, but less than 1 per lineal 5'. Rills not enlarging. Minimal evidence of deposition in channel, and no gullies.	☐ Numerous rills present (>1 rill per lineal 5'), apparently active or enlarging, evidence of delivery to channel, or gullies present.
c) Cracks	☐ None evident	☐ Cracks present, but appear to be stabilized	☐ Present, widening, threatening integrity of fill
d) Slope failures	☐ Less than 1 cubic yard of material	☐ ≥ 1 cubic yard of material moved but does not enter stream	☐ ≥ 1 cubic yard of material moved, material enters stream
2) Road surface			
a) Rilling	☐ Little or no evidence of rills	☐ Some present, but occurs on < 10% of road surface area, or where present do not leave road surface	☐ > 10% of surface has rills 2" deep and 20" in length which continue off road surface onto crossing fill
b) Puddling	☐ No evidence of ponded water	☐ Some ponding, but does not appear to threaten integrity of fill	☐ Ponding present that is causing fill subsidence or otherwise threatening integrity of fill
c) Drainage ditches			
	☐ Stable drainage with little or no sediment delivery to stream	☐ Less than 2 cubic yards erosion but configuration is stable or stabilizing	☐ More than 2 cubic yards of sediment delivery to stream and configuration is unstable/degrading
3) Culvert			
a) Scour at outlet	☐ No evidence of scour	☐ Scour evident, but extends less than 2 channel widths below outlet; and no undercutting of crossing fill	☐ Scour evident that extends more than 2 channel widths below outlet, or scour is undercutting crossing fill
b) Diversion potential	☐ Crossing is configured to pass flows without diversion if culvert fails		☐ If culvert fails, flow will be diverted out of channel and down roadway
c) Plugging	☐ No evidence of sediment or debris restricting flow through pipe	☐ Sediment and/or debris is accumulating, but ≤ 30% of inlet or outlet is blocked	☐ Sediment and/or debris is blocking >30% of inlet or outlet
d) Piping	☐ No evidence of flow beneath or around culvert		☐ ≥ 10% of the flow passes beneath or around culvert, or substantial piping erosion evident

If poor effectiveness is evident, comment on:
(1) Possible causes *(e.g., site sensitivity, inadequate BMP prescription, major storm event, etc.):*

(2) The degree and duration of effects on beneficial uses of water: